Annual Project Report No. FIS 04-414
USFWS Office of Subsistence Management
Fishery Information Services Division

Stock Assessment of Sockeye Salmon from the Buskin River, Kodiak, Alaska, 2005

by

Donn Tracy

and

Julia Schmidt

May 2006

Alaska Department of Fish and Game **Divisions of Sport Fish**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used in Division of Sport Fish Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications without definition. All others must be defined in the text at first mention, as well as in the titles or footnotes of tables and in figures or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
metric ton	mt
milliliter	ml
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
ounce	oz
pound	lb
quart	qt
yard	yd

Spell out acre and ton.

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
hour (spell out for 24-hour clock)	h
minute	min
second	s

Spell out year, month, and week.

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.
All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.
and	&
at	@
Compass directions:	
east	E
north	N
south	S
west	W
Copyright	©
Corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
et alii (and other people)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.,
id est (that is)	i.e.,
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
number (before a number)	# (e.g., #10)
pounds (after a number)	# (e.g., 10#)
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)

Mathematics, statistics, fisheries

alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	F, t, χ^2, etc.
confidence interval	C.I.
correlation coefficient	R (multiple)
correlation coefficient	r (simple)
covariance	cov
degree (angular or temperature)	°
degrees of freedom	df
divided by	÷ or / (in equations)
equals	=
expected value	E
fork length	FL
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
mideye-to-fork	MEF
minute (angular)	'
multiplied by	x
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
standard length	SL
total length	TL
variance	Var

ANNUAL PROJECT REPORT NO. FIS 04-414
USFWS OFFICE OF SUBSISTENCE MANAGEMENT
FISHERY INFORMATION SERVICES DIVISION

STOCK ASSESSMENT OF SOCKEYE SALMON FROM THE BUSKIN RIVER, KODIAK, ALASKA, 2005

By

Donn Tracy
and
Julia S. Schmidt
Division of Sport Fish, Kodiak

May 2006

This investigation was partially financed by the U.S. Fish and Wildlife Service, Office of Subsistence Management through the Fisheries Resource Monitoring Program, under agreement number 701814J564.

This is an annual report to the U.S. Fish and Wildlife Service, Office of Subsistence Management, Fisheries Resource Monitoring Program and has not undergone biometric or peer review by the Division of Sport Fish, Alaska Department of Fish and Game. Thus, information contained herein should be considered preliminary and is subject to revision.

Donn Tracy and Julia S. Schmidt
Alaska Department of Fish and Game, Division of Sport Fish
211 Mission Road, Kodiak, AK 99615-6399, USA

This document should be cited as:
Tracy, D. and J. Schmidt. 2006. Stock assessment of sockeye salmon from the Buskin River, Kodiak, Alaska, 2005. Federal Subsistence Fishery Monitoring Program, Annual Project Report No. FIS 04-414. U. S. Fish and Wildlife Service, Office of Subsistence Management, Fishery Information Services Division, Anchorage, Alaska

TABLE OF CONTENTS

Page

LIST OF TABLES

Table **Page**

LIST OF FIGURES

Figure **Page**

LIST OF APPENDICES

Appendix **Page**

ABSTRACT

Salmon weirs were operated on the Buskin River drainage on Kodiak Island, Alaska, from May 17 – August 15, 2005 to enumerate sockeye salmon *Oncorhynchus nerka*. A total of 15,601 sockeye salmon were counted into Buskin Lake. A total of 2,086 sockeye salmon were also counted into the Lake Louise tributary. The midpoint of the Buskin Lake run occurred on June 13; the midpoint of the Lake Louise tributary run occurred on July 29. Most sockeye salmon in the Buskin Lake escapement were aged 1.3, 2.2 and 2.3; salmon in the Lake Louise tributary run were aged 1.2, 1.3 and 2.2. The preliminary 2005 subsistence harvest was 6,454 sockeye salmon, most of which were aged 1.3 or 2.3.

Key words: Buskin River, Kodiak Island, sockeye salmon, *Oncorhynchus nerka*, weir, subsistence harvest, age composition.

INTRODUCTION

The Buskin River drainage (Figure 1), located approximately 2 miles from the city of Kodiak, supports a subsistence fishery that occurs in marine waters near the mouth of the Buskin River and harvests relatively large numbers of sockeye salmon *Oncorhynchus nerka*. Between 1990 and 1998 annual subsistence harvests averaged approximately 5,000 sockeye salmon, but recently have increased, ranging between 10,000 and 13,000 fish in 2001 - 2003 (Table 1). Currently, the Buskin River is the single largest source of subsistence salmon harvests in federally managed waters within the Kodiak area.

Sockeye salmon from the Buskin River are also harvested by a sport fishery that has been monitored since 1980. Sport harvests have averaged approximately 1,700 sockeye salmon between 1995-2004 (Table 2) and angler effort on the Buskin River has recently represented an average of nearly 35% of the annual freshwater sport fishing effort in the Kodiak Management Area (Schwarz et al. *in prep*), although this statistic also represents sport fishing effort targeting other species besides sockeye salmon, such as coho salmon *O. kisutch,* pink salmon *O. gorbuscha,* and Dolly Varden *Salvelinus malma*. Buskin River sockeye salmon are also harvested commercially, but to a much lesser degree than by subsistence and sport fisheries, at less than 100 fish annually during recent years.

Annual escapements of sockeye salmon returning to the Buskin River have been monitored since 1980. Between 1980 and 1984 escapements were indexed using aerial survey counts and since 1985 a weir has been used to enumerate total escapements. From 1996-2005 sockeye salmon escapements into the Buskin River have averaged more than 15,000 fish (Table 3).

Although sockeye salmon harvests and escapements have been monitored historically, age data from returns of adult fish have been collected consistently only since 1993 (Schwarz and Clapsadl 2000). Consequently, at the present time there is a continuing need for information necessary to assess productivity of this salmon stock and to evaluate the current biological escapement goal (BEG).

The Buskin River is fed primarily by Buskin Lake, although two other tributaries that terminate in small lakes also drain into the Buskin River. Along with Buskin Lake, these small lakes are utilized by sockeye salmon for spawning and rearing habitat. Since 1990 the ADF&G weir has been operated near the outlet of Buskin Lake rather than further downstream, to avoid weir washouts resulting from frequent inriver flooding. Consequently, the inriver return of sockeye salmon to the down river tributaries was not documented. Since 2002 installation of a weir on the main tributary stream from Lake Louise to the Buskin River has

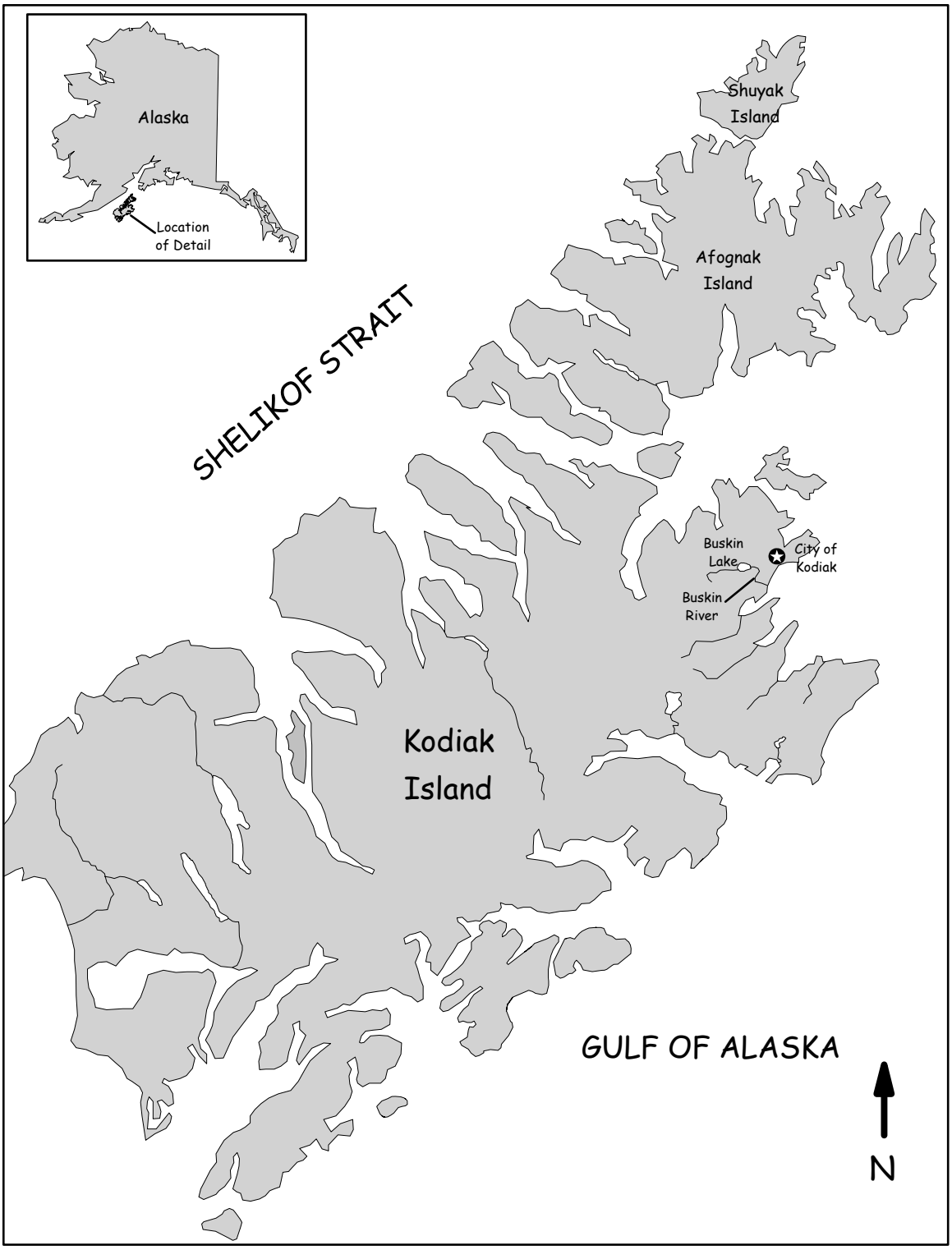

Figure 1.-Map of Kodiak Island showing Buskin River drainage.

provided complete escapement counts of sockeye salmon returning to the drainage. Operation of this tributary weir will continue annually for the duration of the stock assessment study.

Estimates of total return by age from sampling the escapement and subsistence harvest are needed to reconstruct the run and develop brood tables. These tables will be used to evaluate the BEG. Cumulative weir counts are also needed for comparison to historic time of entry data to ensure fisheries are managed so that the current BEG is achieved. Results from this project will ensure that the sustainability of the Buskin River sockeye salmon stock is not negatively impacted by subsistence, recreational, or commercial fisheries.

Table 1.- Subsistence harvests of Buskin River drainage sockeye salmon, 1996-2005.

Year	Reported Subsistence Fishery Harvest
1996	5,403
1997	5,890
1998	6,011
1999	7,985
2000	7,315
2001	10,260
2002	13,588
2003	10,728
2004	9,421
2005	6,454
Average	8,306

Source: ADF&G Commercial Fisheries Division, Kodiak; 2005 data preliminary.

Table 2.- Estimated sport fishery harvest of Buskin River drainage sockeye salmon, 1995-2004.

Year	Estimated Sport Fishery Harvest
1995	1,087
1996	1,881
1997	1,843
1998	1,983
1999	1,467
2000	2,041
2001	826
2002	1,903
2003	3,012
2004	1,380
Average	1,742

Source: 1994-2000, Schwarz et al. 2002; 2001-2004 Schwarz et al. *in prep*.

Table 3.- Escapement of sockeye salmon into the Buskin Lake, 1996-2005.

Year	Escapement
1996	9,661
1997	9,840
1998	14,767
1999	10,812
2000	11,233
2001	20,556
2002	17,174
2003	23,870
2004	22,023
2005	15,601
Average	15,554

Sources: 1995-2000 data from Schwarz et al 2002; 2001-2004 data from Schwarz et al. *in prep*.

Table 4- Escapement of sockeye salmon into Lake Louise, 2002-2005.

Year	Escapement
2002	3,242
2003	4,488
2004	2,086
2005	2,028
Average	2,961

Source: Schwarz et al. *in prep*.

During 2005 objectives of the stock assessment study were to census the sockeye salmon escapement into the Buskin River drainage (through Buskin Lake and Louise Lake weirs) and to estimate the age composition of the escapement and subsistence fishery harvest. This information, along with historic data and sport and commercial harvest estimates, will be used to augment a brood table in development for evaluation of the sockeye salmon BEG.

METHODS

BUSKIN RIVER WEIRS

In 2005 the spawning escapement of sockeye salmon was censused through a weir at the outlet of Buskin Lake from May 17 – August 14 (Table 5; Figure 3). Fish migrating upstream were enumerated as they passed through the weir. Daily counts of sockeye salmon at both locations were entered on salmon weir count data forms. After August 14 the Buskin Lake weir was relocated downstream to enumerate escapement of coho salmon.

A second weir was operated in the tributary stream flowing into the Buskin River from the Lake Louise portion of the drainage beginning on June 4 (Table 6; Figure 4). The return of sockeye

salmon to the Lake Louise tributary was monitored daily through August 31, after which the weir was removed for the year.

AGE-SEX-LENGTH SAMPLING

Sockeye salmon were sampled from the Buskin Lake escapement during each of four temporal strata: June 1–15, June 16-30, July 1-15, and July 16-31. Ideally, sampling was conducted on two days, one week apart, during each stratum. All fish captured on selected days were sampled, even if the daily sample goal was exceeded. On occasions when large numbers of sockeye salmon were observed behind the weir, fish were ideally sampled during the early, middle and late portions of the time interval required for their passage upstream.

Sockeye salmon were also sampled at the Lake Louise weir site during each of four temporal strata: June 1 – July –15, July 16-30, August 1-15, and August 16-31. All fish captured on selected days were sampled, even if the daily sample goal was exceeded.

The subsistence harvest was sampled for age, sex, and length during each of three temporal strata: June 1-15, June 16-30, and July 1-15. Harvested fish were sampled from subsistence fishers opportunistically within each time stratum. Sampling was conducted either from a boat on the fishing grounds or dockside at local boat harbors.

Fish were measured from mid-eye to fork-of-tail and sex determined. Two scales were taken from each fish and mounted on a gum card. Scales were taken from the left side of the body, at a point on a diagonal line from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin, two rows above the lateral line (Clutter and Whitesel 1956). Scales were taken proximal to the preferred region when necessary, although only within the area bounded dorsally by the fourth row of scales above the lateral line, ventrally by the lateral line, and between lines drawn vertically from the posterior insertion of the dorsal fin and the anterior insertion of the anal fin. If scales were not available in the preferred region on the left side of the fish, scales were collected from the preferred region on the right side. Age was interpreted from scales using the criteria of Clutter and Whitesel (1956).

DATA ANALYSIS

Chi-squared statistics were used to test for differences in age and sex composition among temporal strata within each source (i.e., escapement or subsistence harvests) and also between each source. If differences were detected, estimates were stratified to minimize bias. If differences were not detected, age data were pooled to improve precision. The proportion of sockeye salmon from source h (escapement or subsistence harvest) during stratum i (i = 1, 2, 3, 4) in age/sex class j was estimated as a binomial proportion by:

$$\hat{p}_{hij} = \frac{n_{hij}}{n_{hi}} \tag{1}$$

and its variance by:

$$\hat{V}(\hat{p}_{hij}) = \left[\frac{N_{hi} - n_{hi}}{N_{hi}}\right] \frac{\hat{p}_{hij}\left(1 - \hat{p}_{hij}\right)}{n_{hi} - 1}, \tag{2}$$

where:

n_{hij} = the number of sockeye salmon from source h during stratum i that were in age/sex class j,

n_{hi} = the number of sockeye salmon sampled from source h during stratum i, and

N_{hi} = the total number of sockeye salmon in source h during stratum i.

Weir counts and permit returns of subsistence harvests were treated as censuses with no variance. In the event that temporal stratification was required for the subsistence harvest, N_{Si} was calculated by multiplying the total subsistence harvest by the proportion of the sockeye salmon run passing through the weir in temporal stratum i.

The number of fish from source h during stratum i of age/sex class j was estimated by:

$$\hat{N}_{hij} = N_{hi}\hat{p}_{hij}, \tag{3}$$

and its variance by:

$$\hat{V}(\hat{N}_{hij}) = N_{hi}^2\hat{V}(\hat{p}_{hij}). \tag{4}$$

The total number of fish from source h of age/sex class j was estimated as:

$$\hat{N}_{hj} = \sum_{i=1}^{t}\hat{N}_{hij} \tag{5}$$

where t = the number of strata; and the variance was estimated as the sum of the variances as:

$$V\left(\hat{N}_{hj}\right) = \sum_{i=1}^{t}V\left(\hat{N}_{hij}\right). \tag{6}$$

The proportion of sockeye salmon age age/sex class j for the total of source h was estimated as:

$$\hat{p}_{hj} = \frac{\hat{N}_{hj}}{N_h}, \tag{7}$$

where N_h = the total for source h.

The variance of the proportion was estimated by:

$$V\left(\hat{p}_{hj}\right) = \frac{V\left(\hat{N}_{hj}\right)}{N_h^2}. \tag{8}$$

RESULTS

At the conclusion of the 2005 sockeye salmon stock assessment project a total of 15,185 adult fish were counted through the weir located at the outlet of Buskin Lake (Table 5). The entire 2005 escapement (including fish counted after August 15 at the lower weir site) eventually totaled 15,601 (Table 3). The highest daily count of 1,865 sockeye salmon occurred on June 7 and the midpoint of the run occurred on approximately June 14 (Table 5; Figure 3). Age, length and sex data were collected from 449 sampled fish, and sex and length only data from an

additional 51 fish. Age compositions were not significantly different by temporal strata (χ^2 = 5.12, df = 6, P =0.52). Fish comprising the escapement were primarily aged 1.3 and 2.3 (Appendix A1). Mean length of females in the escapement was 500 mm (SE = 37 mm) and mean length of males was 521 mm (SE = 61 mm).

A total of 2,028 sockeye salmon were counted through the weir located on the Lake Louise tributary stream (Table 6). The single highest daily count of 1,045 sockeye salmon occurred on August 3 and the midpoint of the run also occurred on this date (Table 6; Figure 4). Age, length and sex data were collected from 415 sampled fish and sex and length only data from an additional 28 fish. Age compositions were significantly different by temporal strata (χ^2 = 31.72, df = 9, P<0.001) and were subsequently stratified. Most fish bound for Lake Louise were ages 1.2, 1.3 and 2.2, although a large component of the male return was also comprised age 1.1. (Appendix A2). Mean length of Lake Louise females was 484 mm (SE = 46 mm) and mean length for males was 462 mm (SE = 76 mm).

At the time of this report, a preliminary tally of more than 6,400 sockeye salmon was reported taken in the 2005 subsistence harvest. We believe there to currently be an incomplete accounting of the total harvest. There was not a significant difference in age compositions of fish sampled from the harvest by temporal strata (χ^2 = 2.93, df = 2, P = 0.23). Most fish in the subsistence harvest were ages 1.3 or 2.3 (Appendix A3). Mean length of females was 529 mm (SE = 23 mm), and 548 mm (SE = 27 mm) for males.

The age composition of the Buskin Lake escapement was not significantly different from the subsistence harvest (χ^2 = .54; df = 2; P = 0.46).

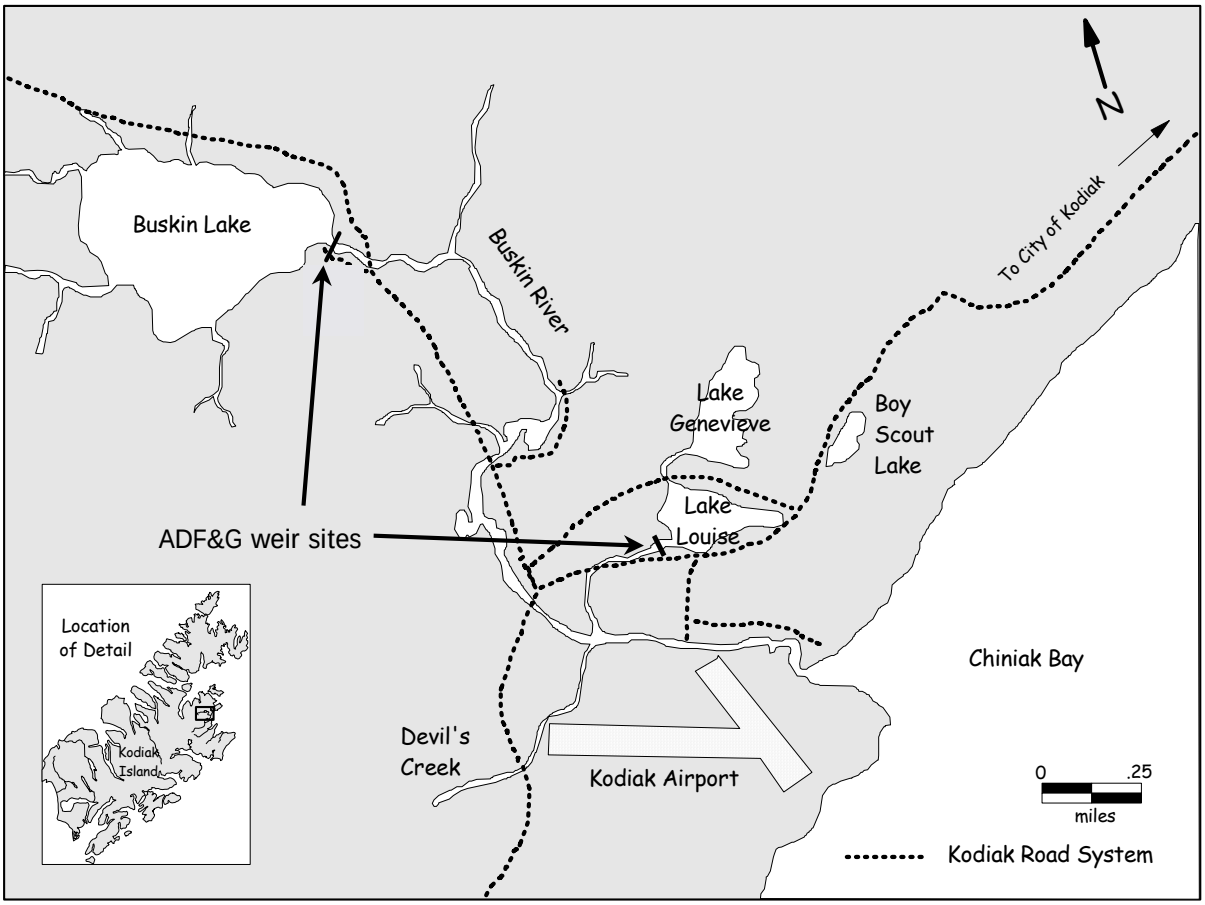

Figure 2.-Location of the Buskin River drainage weirs, 2005.

Table 5.-Immigration of sockeye salmon through the Buskin Lake outlet weir by date, 2005.

Date	Daily Count	Cumulative Count	% of Total	Date	Daily Count	Cumulative Count	% of Total
17-May	0	0	0%	1-Jul	88	11,362	73%
18-May	0	0	0%	2-Jul	54	11,416	73%
19-May	0	0	0%	3-Jul	251	11,667	75%
20-May	0	0	0%	4-Jul	26	11,693	75%
21-May	0	0	0%	5-Jul	394	12,087	77%
22-May	0	0	0%	6-Jul	103	12,190	78%
23-May	0	0	0%	7-Jul	247	12,437	80%
24-May	181	181	1%	8-Jul	33	12,470	80%
25-May	37	218	1%	9-Jul	42	12,512	80%
26-May	206	424	3%	10-Jul	38	12,550	80%
27-May	67	491	3%	11-Jul	135	12,685	81%
28-May	170	661	4%	12-Jul	735	13,420	86%
29-May	15	676	4%	13-Jul	24	13,444	86%
30-May	175	851	5%	14-Jul	13	13,457	86%
31-May	263	1,114	7%	15-Jul	41	13,498	87%
1-Jun	22	1,136	7%	16-Jul	2	13,500	87%
2-Jun	0	1,136	7%	17-Jul	609	14,109	90%
3-Jun	867	2,003	13%	18-Jul	16	14,125	91%
4-Jun	771	2,774	18%	19-Jul	0	14,125	91%
5-Jun	5	2,779	18%	20-Jul	1	14,126	91%
6-Jun	151	2,930	19%	21-Jul	73	14,199	91%
7-Jun	1,865	4,795	31%	22-Jul	4	14,203	91%
8-Jun	585	5,380	34%	23-Jul	1	14,204	91%
9-Jun	860	6,240	40%	24-Jul	0	14,204	91%
10-Jun	412	6,652	43%	25-Jul	157	14,361	92%
11-Jun	96	6,748	43%	26-Jul	96	14,457	93%
12-Jun	520	7,268	47%	27-Jul	428	14,885	95%
13-Jun	138	7,406	47%	28-Jul	25	14,910	96%
14-Jun	285	7,691	49%	29-Jul	25	14,935	96%
15-Jun	398	8,089	52%	30-Jul	41	14,976	96%
16-Jun	245	8,334	53%	31-Jul	55	15,031	96%
17-Jun	504	8,838	57%	1-Aug	2	15,033	96%
18-Jun	136	8,974	58%	2-Aug	2	15,035	96%
19-Jun	793	9,767	63%	3-Aug	0	15,035	96%
20-Jun	154	9,921	64%	4-Aug	0	15,035	96%
21-Jun	12	9,933	64%	5-Aug	0	15,035	96%
22-Jun	403	10,336	66%	6-Aug	0	15,035	96%
23-Jun	83	10,419	67%	7-Aug	10	15,045	96%
24-Jun	86	10,505	67%	8-Aug	10	15,055	97%
25-Jun	4	10,509	67%	9-Aug	12	15,067	97%
26-Jun	316	10,825	69%	10-Aug	19	15,086	97%
27-Jun	149	10,974	70%	11-Aug	28	15,114	97%
28-Jun	236	11,210	72%	12-Aug	22	15,136	97%
29-Jun	1	11,211	72%	13-Aug	28	15,164	97%
30-Jun	63	11,274	72%	14-Aug	21	15,185	97%

Table 6.-Immigration of sockeye salmon through the Lake Louise weir by date, 2005.

Date	Daily Count	Cumulative Count	% of Total	Date	Daily Count	Cumulative Count	% of Total
4-Jun	0	0	0%	20-Jul	4	216	11%
5-Jun	0	0	0%	21-Jul	3	219	11%
6-Jun	0	0	0%	22-Jul	7	226	11%
7-Jun	0	0	0%	23-Jul	0	226	11%
8-Jun	0	0	0%	24-Jul	0	226	11%
9-Jun	0	0	0%	25-Jul	25	251	12%
10-Jun	2	2	0%	26-Jul	23	274	14%
11-Jun	1	3	0%	27-Jul	5	279	14%
12-Jun	0	3	0%	28-Jul	4	283	14%
13-Jun	0	3	0%	29-Jul	15	298	15%
14-Jun	0	3	0%	30-Jul	14	312	15%
15-Jun	2	5	0%	31-Jul	2	314	15%
16-Jun	0	5	0%	1-Aug	9	323	16%
17-Jun	0	5	0%	2-Aug	76	399	20%
18-Jun	2	7	0%	3-Aug	1,045	1,444	71%
19-Jun	1	8	0%	4-Aug	161	1,605	79%
20-Jun	1	9	0%	5-Aug	49	1,654	82%
21-Jun	1	10	0%	6-Aug	28	1,682	83%
22-Jun	0	10	0%	7-Aug	11	1,693	83%
23-Jun	0	10	0%	8-Aug	12	1,705	84%
24-Jun	0	10	0%	9-Aug	10	1,715	85%
25-Jun	11	21	1%	10-Aug	22	1,737	86%
26-Jun	5	26	1%	11-Aug	18	1,755	87%
27-Jun	11	37	2%	12-Aug	20	1,775	88%
28-Jun	8	45	2%	13-Aug	14	1,789	88%
29-Jun	2	47	2%	14-Aug	5	1,794	88%
30-Jun	22	69	3%	15-Aug	14	1,808	89%
1-Jul	14	83	4%	16-Aug	9	1,817	90%
2-Jul	13	96	5%	17-Aug	77	1,894	93%
3-Jul	2	98	5%	18-Aug	23	1,917	95%
4-Jul	9	107	5%	19-Aug	13	1,930	95%
5-Jul	6	113	6%	20-Aug	10	1,940	96%
6-Jul	13	126	6%	21-Aug	10	1,950	96%
7-Jul	12	138	7%	22-Aug	14	1,964	97%
8-Jul	4	142	7%	23-Aug	16	1,980	98%
9-Jul	0	142	7%	24-Aug	10	1,990	98%
10-Jul	1	143	7%	25-Aug	9	1,999	99%
11-Jul	3	146	7%	26-Aug	5	2,004	99%
12-Jul	0	146	7%	27-Aug	0	2,004	99%
13-Jul	5	151	7%	28-Aug	9	2,013	99%
14-Jul	6	157	8%	29-Aug	8	2,021	100%
15-Jul	3	160	8%	30-Aug	2	2,023	100%
16-Jul	7	167	8%	31-Aug	5	2,028	100%
17-Jul	40	207	10%				
18-Jul	5	212	10%				
19-Jul	0	212	10%				

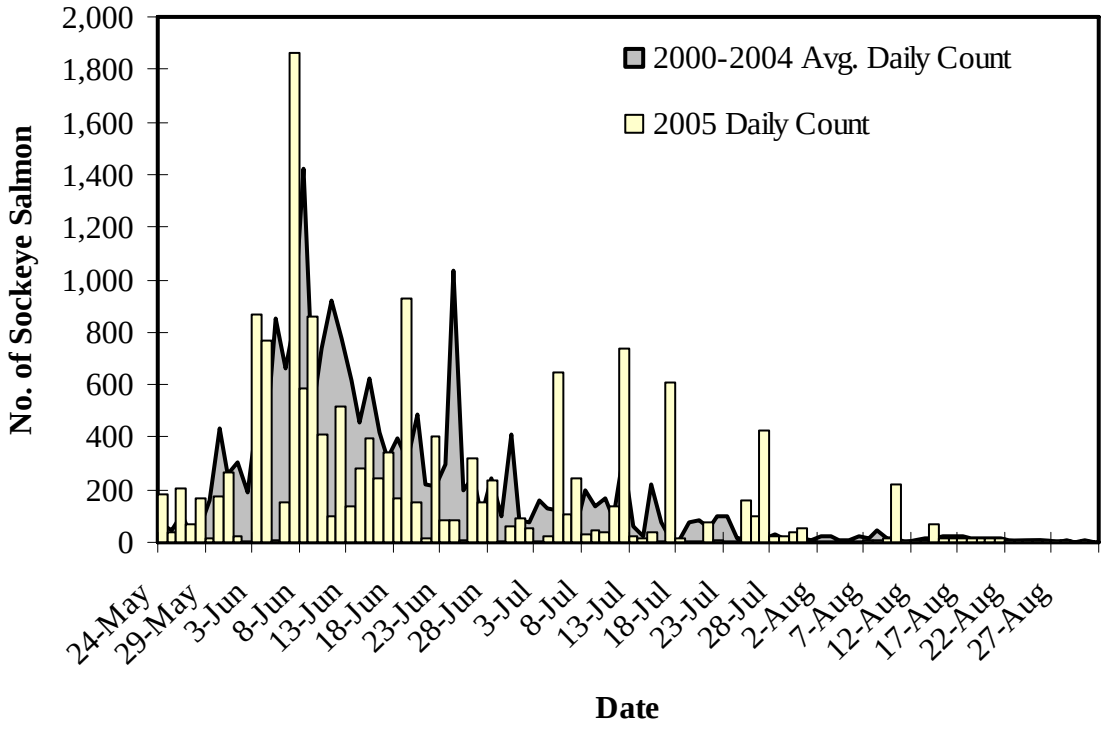

Figure 3.-Buskin Lake average daily sockeye salmon weir count, 2000-2004 and daily weir count in 2005.

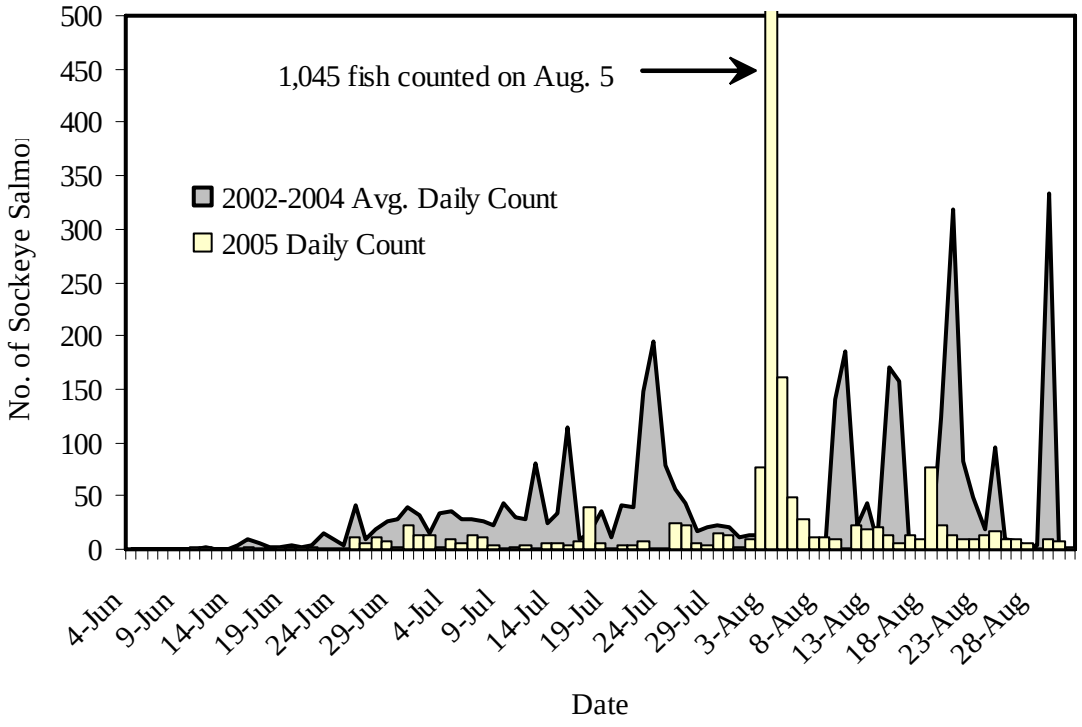

Figure 4.-Lake Louise average daily sockeye salmon weir count, 2002-2004, and daily weir count in 2005.

DISCUSSION

The 2005 escapement of sockeye salmon into Buskin Lake was nearly identical to the most recent 10-year average. As mentioned previously, the 2005 subsistence harvest of more than 6,400 fish is likely a partial count of the total harvest, which typically is tallied from receipt of additional harvest reports in exchange for renewed subsistence permits. It's probable that the final 2005 harvest will reflect the recent trend of increased activity in this fishery. Information obtained from the stock assessment project through 2003 has been used to complete an initial analysis for evaluation of the sockeye salmon BEG, the results of which are presented in Schmidt et al. (*in press*). Data results from the 2005 project, including escapements, subsistence harvests and corresponding age composition estimates will be used along with sport and commercial harvest data to refine this analysis through expanded development of a sockeye salmon brood table.

ACKNOWLEDGMENTS

The U.S. Fish and Wildlife Service, Office of Subsistence Management provided $65,149 in funding support for this project through the Fisheries Resource Monitoring Program, under agreement number 701814J564.

LITERATURE CITED

Clutter, R., and L. Whitesel. 1956. Collection and interpretation of sockeye salmon scales. International Pacific Salmon Fishery Bulletin 9. 159 pp.

Schmidt, J., Evans D. and D. Tracy. *In Press*. Age Composition, Spawning Escapement, Total Return and Analysis of the Spawner-Recruit Relationship for Sockeye Salmon in the Buskin River. Alaska Department of Fish and Game, Sport Fish Division, Fishery Data Series Report, Anchorage.

Schwarz, L. J., M. Clapsadl 2000. Area Management Report for the Recreational Fisheries of the Kodiak and Alaska Peninsula/Aleutian Islands Regulatory Areas, 1997 and 1998. Alaska Department of Fish and Game, Sport Fish Division, Fishery Management Report No. 00-1, Anchorage.

Schwarz, L. J., Schmidt J. S. and D. Tracy. *In Prep*. Area Management Report for the Recreational Fisheries of the Kodiak and Alaska Peninsula/Aleutian Islands Regulatory Areas, 2001 - 2003. Alaska Department of Fish and Game, Sport Fish Division, Fishery Management Report, Anchorage.

APPENDIX A. SUPPORTING DATA

Appendix A1.-Estimated age composition of Buskin River sockeye salmon escapement, 2005.

Run Component	Age								
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	Total
Males									
Sample Proportion	2.0	3.1	13.8	0.0	0.7	9.4	18.5	0.2	47.7
SE	0.7	0.8	1.6	0.0	0.4	1.4	1.8	0.2	2.4
Estimated Run	313	486	2,154	0	104	1,459	2,884	35	7,436
SE	103	128	254	0	60	215	286	35	368
Females									
Sample Proportion	0.0	4.9	17.4	0.0	0.4	8.5	20.9	0.2	52.3
SE	0.0	1.0	1.8	0.0	0.3	1.3	1.9	0.2	2.4
Estimated Run	0	764	2,710	0	69	1,320	3,266	35	8,165
SE	0	159	279	0	49	205	300	35	368
Total									
Sample Proportion	2.0	8.0	31.2	0.0	1.1	0.0	39.4	0.4	
SE	0.7	1.3	2.2	0.0	0.5	0.0	2.3	0.3	
Estimated Run	313	1,251	4,868	0	172	0	6,150	69	15,601
SE	103	200	343	0	78	0	360	49	

Appendix A2.-Estimated age composition of Lake Louise sockeye salmon escapement, 2005.

Run Component	Age								
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	Total
Males									
Sample Proportion	20.4	9.0	10.9	0.0	6.4	2.4	2.5	0.0	51.6
SE	2.0	1.4	1.5	0.0	1.2	0.8	0.8	0.0	2.5
Estimated Run	415	182	222	0	129	49	50	0	1,047
SE	40	28	31	0	24	15	16	0	50
Females									
Sample Proportion	3.4	11.7	13.7	0.0	1.3	16.4	1.9	0.0	48.4
SE	0.8	1.6	1.7	0.0	0.5	1.8	0.6	0.0	2.5
Estimated Run	69	238	278	0	26	333	39	0	981
SE	0	32	34	0	10	37	12	0	50
Total									
Sample Proportion	24.3	20.7	24.6	0.0	3.5	22.8	4.1	0.0	100.0
SE	2.1	2.0	2.1	0.0	0.9	2.1	1.0	0.0	
Estimated Run	493	420	500	0	72	462	83	0	2,028
SE	43	40	43	0	18	0	20	0	

Appendix A3.-Estimated age composition of Buskin River sockeye salmon subsistence harvest, 2005.

Run Component	Age								
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	Total
Males									
Sample Proportion	0.0	3.7	22.1	0.0	0.0	2.6	31.6	0.0	60.0
SE	0.0	1.4	3.0	0.0	0.0	1.2	3.4	0.0	3.6
Estimated Harvest	0	238	1,427	0	0	170	2,038	0	3,872
SE	0	88	195	0	0	75	218	0	230
Females									
Sample Proportion	0.0	1.6	13.7	0.0	0.0	2.6	23.7	0.0	41.6
SE	0.0	0.9	2.5	0.0	0.0	1.2	3.1	0.0	3.6
Estimated Harvest	0	102	883	0	0	170	1,529	0	2,684
SE	0	59	161	0	0	75	200	0	231
Total									
Sample Proportion	0.0	5.8	42.6	0.0	0.0	4.7	46.8	0.0	100.0
SE	0.0	1.7	3.6	0.0	0.0	1.5	3.6	0.0	
Estimated Harvest	0	374	2,751	0	0	306	3,023	0	6,454
SE	0	110	232	0	0	100	234	0	